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Developing a Career Decision Making Indicator (CDMI)

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Abstract

The paper reports a study which develops a career decision-making indicator scale for school students. Using data from 1880 high school students, a series of five studies developed and validated a measure of the Career Decision Making Indicator (CDMI) tailored to adolescents in Oman. The CDMI measures the individual along eight dimensions: Decidedness, Comfort, Career Choice Anxiety, External Barrier, Need for Career Information, Readiness, Career Salience, and Inconsistent Information. The scale has been validated through a scientific method in order to ensure its reliability and validity. Two advanced statistical methods were used, namely: Exploratory factor analysis (EFA) and Confirmatory factors analysis (CFA). The EFA was used to identify the underlying dimensions of each construct of the instrument, while CFA was used to confirm the dimension and to analyze the fitness of the data collected in hypothesized model. The results provide evidence that the developed scale achieved sound psychometric properties. The overall reliability value of Cronbach's Alpha was .935. The result of EFA showed that, the Career Decision Making Indicator construct produced eight significant factors. The CFA results showed that the goodness-of-fit indices for the hypothesized model were as follows: χ^2 =1674.711, df= 674, CMIN/df= 2.485, CFI=.917, GFI= .930, AGFI= .919, PCOLOSE =1.00 and RMSEA =.036; each of the indices was above the threshold value. Results imply that CDMI is a valid measure to describe the career decision pattern among adolescents. However further studies are recommended to further validate the scale.

Keywords: - Decidedness, Comfort, External Barrier, Readiness, Career Salience.

1. Introduction

Career indecision is a multidimensional problem that is applicable to a differential diagnostic approach and is influenced by cultural factors (Gati, krausz, & Osipow, 1996; Tak & Lee, 2003). Such problem faced by many school and college students as well as adults. Career counseling psychologists should clearly understand the causes and types of problems clients face when choosing careers. Career counselors should classify students, who are clear or unclear about their future careers in order to tailor intervention strategies based on individual needs. They should also differentiate students with chronic problems, through the course of vocational assessment (Tak & lee, 2003). A career counselor should also differentiate the types and causes of problems the client has. Several measures of career

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indecision have been developed for differentiating among persons who are undecided about their career choice, thus career interventions can be better adapted to meet their needs (Osipow, Carney, Winer, Yanico, & Koschier, 1976). Many researchers in career decision-making conclude that career decision-making can be attributed to cultural factors (Fouad, 1993; Gati, Krausz, & Osipow, 1996). An individual's decision is a by-product of the relationships between the individual's psychological traits, his or her sense of value of an occupation, and alternatives. It is also affected by the length of training, the degree of dependence, and the type of relationships with people (Gati, Osipow, & Givon, 1995; Tak & Lee, 2003). Therefore, the career decision-making is directly affected by one's own cultural and social specificity. Measures are required to assess issues faced by clients; and therefore people from different culture require different measures that fit their cultures. This study attempts to fill the gap in psychometric tests, particularly the career test in Oman by constructing a reliable and valid instrument to assess career decision-making construct for Omanis school students.

2. Purpose

The purpose of this study was to develop a scale that evaluates factors affecting career decisions made by Omani high school students.

3. Method

The study was carried out using survey methods. The population for this study was high school students in the Sultanate of Oman. The participants constituted 1880 students from the 10th, 11th, and 12th grade, who were randomly selected from the graduating class of 2008 in the Sultanate of Oman. Stratified Random Sampling methods were used to select the participants. Five different samples were used in this study, which were randomly selected from Oman. Students were 14 - 18 years old, with an average age of 16.5, S.D = 1.13. They were all Muslims having Arabic as their mother tongue.

4. Procedure

The procedure involved two main stages; the development of the Career Decision Making Indicator, and data collection.

4.1. The development of the Career Decision Making Indicator

This study is guided in the development of the Career Decision Making Indicators (CDMI) scale by a three-dimensional model of career decision status (Decidedness, Comfort, and Reasons), which is introduced by Jones & Chenery (1980).The new instrument was first designed to measure individuals along three main dimensions: Decidedness, Comfort, and Reasons for Indecision. However, the third dimension was extended to include other dimensions highlighted by the career decision-making literature, such as the Taxonomy of Difficulties in Career Decision Making proposed by Gati, Krausz and Osipow (1996) which was based on decision theory. The taxonomy includes three major categories of difficulties, namely Lack of Readiness, Lack of Information, and Inconsistent Information, which are further divided into 10 specific difficulty areas. These categories were also derived from the cause dimensions of the Missouri Diagnostic Plan (Callis, 1965). In addition, the career decision making literature indicates that informational and personal- emotional dimensions can be subdivided into two information factors (Need for Career Information and Need for Self-Knowledge) and three personal-emotional factors (Self-Esteem, Career Choice Anxiety, and Generalized Indecisiveness) (Chartrand, Robbins, Morrill, & Boggs, 1990). Seven dimensions from this review were included in the new instrument along with another dimension called the External Barrier. The External Barrier measured items of financial difficulty, family considerations, religious constraints, and the tendency for academic cliques to dominate. It represented factors specific to the culture of Oman.

A preliminary pool of items was generated from the literature on career decision-making, interviews with adolescents, and interviews with professionals who were providing psychological services to adolescents. This pool supplements items from previously published career decision-making questionnaires besides the professional recommendations. Students who participated in this study were also asked an open-ended question, "Describe ten

reasons why you have difficulty in deciding on a future career". Finally a total of 97 items selected for the first version of the CDMI, those agreed upon the majority of judges, were considered to be content-valid. The summary of the contents of the instrument and its dimensions are presented below.

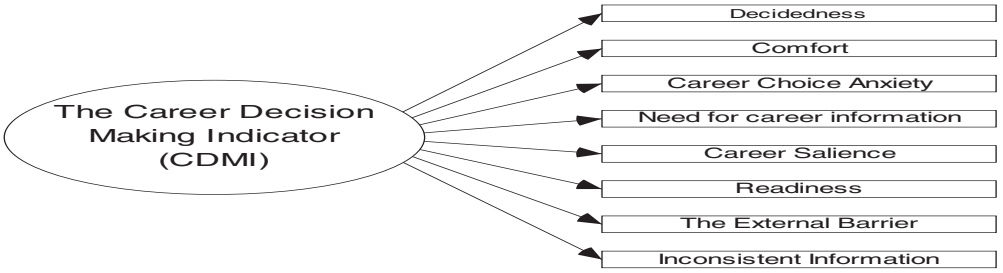

Figure 1. Constructs, & Dimensions for CDMI

4.2. Data Collection

A series of five studies were conducted to develop and validate the scale.

4.2.1. Study 1:

The purpose of this study was to establish initial scale construction and reliability analysis. The newly developed CDMI measures the individual along eight dimensions: Decidedness, Comfort, Career Choice Anxiety, External Barrier, Need for Career Information, Readiness, Career Salience, and Inconsistent Information. The first version of the CDMI consists of 97 items with Decidedness measured by 12 items, Comfort by 8 items, Career Choice Anxiety by 10 items, External Barrier by 10 items, Need for Career Information by 16 items, Readiness by 13 items, Career Salience by 16 items, and Inconsistent Information by 12 items. The items follow a Likert-type format consisting of statements with which respondents are asked to express agreement or disagreement by selecting one of five labeled choices (strongly disagree, disagree, neutral/undecided, agree, strongly agree). A total of 254 students (123 males and 131 females) from the 10th, 11th, and 12th grade participated in the study, aged 14-19 years old, with an average age of 16.66, S.D =1.025.

4.2.1.1. Results and discussion

Internal consistency reliability for each of the CDMI dimensions was assessed by Cronbah's alpha. Eleven items were deleted from the total scale, in an effort to increase the scale reliability. Coefficient alphas for the CDMI were .75 for Decidedness, .67 for Comfort, .73 for Career Choice Anxiety, .65 for External Barrier, .81 for Need for Career Information, .70 for Readiness .79 for Career Salience and .79 for Inconsistent Information. The internal consistency reliabilities indicated as an acceptable to good level of reliability.

4.2.2. Study 2:

The purpose of this study was to conduct an exploratory factor analysis of the CDMI. Exploratory factor analysis (EFA) is a primarily data-driven technique for discovering what underlying structure the sample data could process (Bollen, 1989). It can be used for two main purposes in scale development: (1) to reduce the number of items in a scale thus the remaining items maximize the scale's reliability and (2) to identify possible underlying dimensions in a scale (Netemeyer, Bearden, & Sharma, 2003). The CDMI used for the study had undergone minor changes on three items. Coefficient Alpha for the CDMI were .75 for Decidedness, .67 for Comfort, .73 for Career Choice Anxiety, .65 for External Barrier, .81 for Need for Career Information, .70 for Readiness .79 for Career Salience and .79 for Inconsistent Information. A total of 457 students (230 males and 227 females) from the 10th, 11th, and 12th grade participated in the study, aged 12-20 years old, with an average age of 16.24, S.D =1.127. The modified CDMI were distributed to the selected participants and data was analyzed using EFA.

4.2.2.1. Results and Discussion

Exploratory Factor Analysis using Varimax rotation with Kaiser Normalization was selected to reduce a larger number of variables to a smaller set of uncorrelated variables (Hair, Black, Babin, Anderson, & Tatham, 2006). The data indicated that the measure for sampling adequacy (MSA) for all variables was greater than the acceptable level of .60. Table 1 displays the rotated component matrix for the CDMI.

Table 1. Rotated Component Matrix for the CDMI

Item	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8
CR4	**.641**	168	152	102	127	153	150	061
CR5	**.623**	.308	.085	.124	.125	.092	.043	.207
CR3	**.562**	.148	-.033	.144	.151	.168	.024	-.069
CR6	**.529**	.352	.119	.019	.107	.145	.062	.102
CR1	**.523**	.229	.182	.141	.361	.063	.058	-.005
CH5	**.522**	.190	.180	.093	.026	.333	.080	.120
CH6	**.506**	.206	.150	.055	.200	.053	.121	.276
CD6	**.485**	.228	.257	.223	.211	.145	.091	.060
CR2	**.450**	.324	.130	.048	.078	.174	.068	.378
CD5	**.432**	.184	.191	.287	.230	.278	.073	-.169
CN14	.239	**.662**	.116	-.026	.083	.116	.138	.041
CN12	.275	**.617**	.217	.104	-.141	082	-.001	.081
CN15	.192	**.573**	.179	.042	.162	.194	.140	.004
CN10	.317	**.564**	.156	.130	.060	.167	.009	.194
CN7	.268	**.547**	.104	.213	.092	.002	-.085	-.018
CN2	.013	**.524**	-.086	-153	.232	.369	.224	-.088
CI9	.135	**.523**	.009	.154	.233	.116	-.101	.227
CN8	.255	**.496**	-.021	.060	.173	.347	.058	.017
CS8	.156	.109	**.758**	.038	.248	.079	.073	-.023
CS9	.163	.151	**.741**	.061	.190	.132	.089	.020
CS12	.132	.098	**.631**	.090	.348	.097	.073	-.018
CN16	.169	.328	**.552**	.169	.211	.160	.035	.056
CO4	.167	.170	.074	**.659**	.004	.092	.263	.006
CO3	.109	.049	.089	**.652**	-.027	.163	.092	.152
CO1	.125	-.053	.101	**.643**	.044	.255	.104	.071
CO2	.108	.130	.071	**.637**	.013	.054	.288	-.060
CD10	.075	.009	-.094	**.452**	.093	.020	.228	.440
CD4	.039	.160	-.021	**.424**	-.032	.043	.418	.204
CE6	.084	.211	.053	.090	**.654**	.056	-.196	.130
CE5	.299	-.013	.235	.059	**.632**	.025	.025	-.021
CE7	.242	.015	.148	-.114	**.580**	.077	.020	-.152
CE3	.043	.138	.345	.012	**.542**	.208	.167	.044
CD2	.071	.073	.402	-.034	**.522**	.079	.107	.014
CI11	.083	.346	.244	.041	**.442**	.151	.097	.156
CH9	.258	.270	.284	-.006	**.400**	.038	.174	.188
CI5	.091	.110	.240	.241	.166	**.600**	-.026	.025
CI1	.187	.115	.175	.201	.150	**.592**	.112	.106
C112	.199	.249	.066	.193	.097	**.569**	123	.087
CI6	.350	.252	.177	.123	-.072	**.475**	-.078	.181
CI4	.339	.355	.029	.047	.079	**.457**	.102	.098
CI3	.340	.361	.007	.163	.074	**.403**	-.034	.070
CD7	.119	.043	-.051	.241	.103	.036	**.648**	.086
CD11	.046	.039	.147	.149	.020	.060	**.639**	.094
CD9	.123	.129	.121	.351	-.046	.080	**.624**	.107
CD4	.059	-.130	.413	.140	.042	.011	**.509**	-.083
CH2	-.039	.147	.035	.351	-.027	-.039	203	**.650**
CH1	.321	.028	-.021	.010	.017	.321	.030	**.602**
CH3	.362	.198	-.017	-.090	.020	.388	.056	**.472**
Eigen value	**12.69**	**3.27**	**2.77**	**1.32**	**1.28**	**1.14**	**1.09**	**1.05**
Percentage of variance	**26.4**	**6.8**	**5.8**	**2.8**	**2.7**	**2.4**	**2.3**	**2.2**

As shown in table 1, the analysis of the CDMI data produced eight significant factors, which accounted for 51.245% of total variance explained. The first factor was labeled “Readiness”, a total of 10 items loaded in this factor, which accounted for 26.4 % of the scale variance. The Second factor explained 6.8% of variance and included 8 items. This factor was labeled “Need for Career Information”. The third identified factor was “Career Salience”, which accounted for 5.8% of scale variance, including 4 items with above .40 loaded on it. The fourth

factor was labeled "Comfort", a total of 6 items loaded in this factor, which accounted for 2.8% of variance explained. The Fifth factor was labeled "External Barrier" and explained 2.7% of variance. It included 7 items with loading above .40. The sixth identified factor was "Inconsistent Information", which accounted for 2.4 % of scale variance and had 6 items with above .40 factor loading. The seventh identified factor was "Decidedness", which accounted for 2.3 % of scale variance and had 4 items with factor loading above .40. The final factor was labeled "Career Choice Anxiety", which accounted for 2.2% of variance, and had only three items with acceptable factor loading. A total of 28 items were lost due to low loadings with their a priori assigned scales and only 48 items retained and used for the next analysis.

4.2.3. Study 3:

The purpose of this study was to conduct a confirmatory factor analysis (CFA) of the CDMI. The CFA was used to confirm the exploratory model. CFA is a structural equation modeling technique used to determine the goodness of fit between a hypothesized model and the sample data (Kline, 2005).

The following goodness-of-fit indices were used to assess the degree of fit between the model and the sample: The Minimum Fit Function Chi-Square χ^2, the minimum value of discrepancy between the observed data and the hypothesized model divided by the degrees of freedom (CMIN/df), the Comparative Fit Index (CFI), Root Mean Square error of approximation (RMSEA), the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI) and P-values (PCLOSE). Thus, in this case, the value for the CIMN/df with a value of between 2 and 5 is considered acceptable. The possible values of GFI, CFI and AGFI range from zero to one, with values close to one showing a good fit. The value of RMSEA of .08 or less shows a reasonable error of estimation (Kline, 2005; Byrne, 2001). A total of 959 students (400 males and 559 females) from the 10th, 11th, and 12th grade participated in the study, aged 12-21 years old, with an average age of 16.52, S.D =1.135.

4.2.3.1. Results and Discussion

The eight-factor solution derived from the EFA was cross-validated on 959 participants retained from the overall sample on which EFA was conducted. The initial model was run, and resulted in a poor fit. Nine items were removed from the scale because it cross-loaded on more than one factor and this resulted in an improved model.

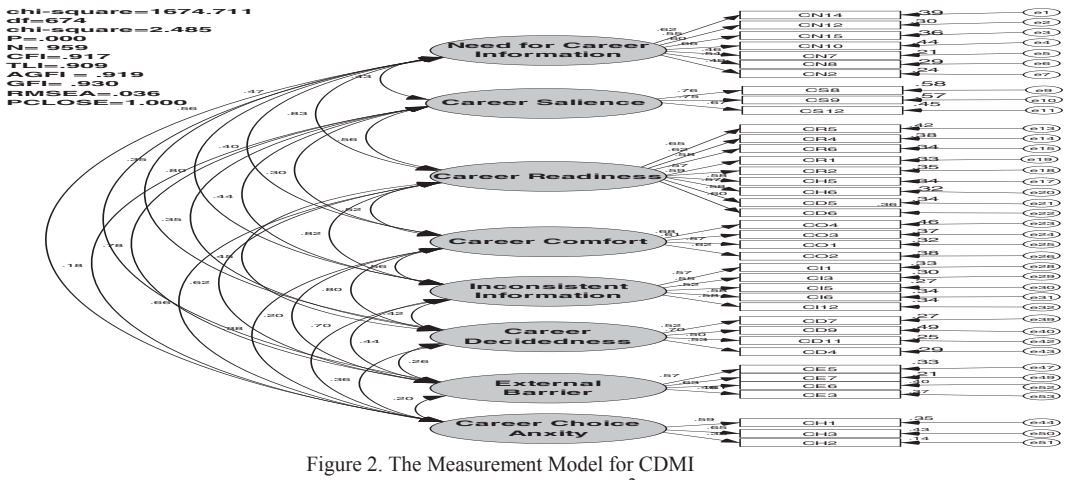

Figure 2. The Measurement Model for CDMI

The CFA results showed an adequate fit to study data, except the χ^2 value is significant, which is due to the large sample size. Other indices all meet to the suggested requirements for an adequate model (Bentler, 1990; Bollen, 1989). The goodness-of-fit indices for the hypothesized model were as follows: χ^2 =1674.711, df= 674, CMIN/df= 2.485, CFI=.917, GFI= .930, AGFI= .919, PCOLOSE =1.00 and RMSEA =.036; each of the indices was above the threshold values.

4.2.4. Study 4:

The purpose of this study was to examine the convergent validity of the CDMI by correlating measures of each of the career decision-making constructs from the CDMI with measures of corresponding constructs assessed by the Career Decision Scale (CDS: Osipow, Carney, Winer, Yanico, & Koschier, 1976), and with the Career Decision Difficulties Questionnaire (CDDQ: Gati, krausz, & Osipow, 1996).

A total of 160 students (60 males and 100 females) from the 10th, 11th, and 12th grade participated in the study, aged 15-20 years old, with an average age of 17.13, S.D =.762. Brief descriptions of the three measures are as follows:

The Final CDMI measures individuals along eight dimensions: Decidedness, Comfort, Career Choice Anxiety, External Barrier, Need for Career Information, Readiness, Career Salience, and Inconsistent Information. It consists of 39 items with Decidedness measured by 4 items, Comfort by 4 items, Career Choice Anxiety by 3 items, External Barrier by 4 items, Need for Career Information by 7 items, Readiness by 9 items, Career Salience by 3 items, and Inconsistent Information by 5 items. The items follow a Likert-type format consisting of statements with which respondents are asked to express agreement or disagreement by selecting one of five labeled choices (strongly disagree, disagree, neutral/undecided, agree, strongly agree).

The Career Decision Scale (Osipow, Carney, Winer, Yanico, & Koschier, 1976), measures the extent of certainty regarding a career and the antecedents of career indecision. It consists of 18 items, with Items 1 and 2 reflecting career choice certainty. Items 3 through 18 represent antecedents of career indecision. The items follow a Likert-type format and scores range from 1 "Not at all like me" to 4 "Exactly like me". High scores on the first two items reflect certainty, whereas high scores on the remaining items are indicative of indecision. A factor analysis of the 16 antecedent items revealed four factors: (1) lack of structure and confidence, (2) perceived external barriers, (3) positive choice conflict, and (4) personal conflict (Osipow, Carney, Winer, Yanico, & Koschier, 1976).

The Career Decision Difficulties Questionnaire (CDDQ; Gati, krausz, & Osipow, 1996), measures three main categories of career decision making difficulty: Lack of Readiness (R), Lack of Information (L), and Inconsistent Information. The scale also yields a total score which is an indication of the severity of difficulties being faced by an individual respondent.

4.2.4.1. Procedures

The CDMI and CDS were administrated to a random sample of 120 students, while, the CDMI and the CDDQ were administrated to a random sample of 40 students. They were asked to answer both of these instruments and return them to the researcher one week later.

4.2.4.2. Results and Discussion

Table 2 displays the correlations for common constructs from the CDMI and the CDS. As can be seen in table 2, the results provided support for the convergent validity of the CDMI. It was expected that since both the CDS and CDMI are measures of reasons of indecision, there would be a positive relationship between six scales from the CDMI namely: Need for Career Information (CN), Readiness (CR) Inconsistent Information (CI), Career Choice Anxiety (CH), External Barrier (CE) and Career Salience (CS), with the Indecision scale from the CDS. It was also expected that Decidedness and Comfort Scales would be positively correlated with the certainty scale from the CDS. The results confirm this expectation.

Table 2. Correlations between Scales from the CDMI and the CDS main scale

CDS Scales / CDMI Scales	Certainty scale	Indecision scale
Career Decidedness	.439**	-261**
Career Comfort (CO)	.382**	-.386**
Career Choice Anxiety	-.241**	.354**
Need for Career	-.211*	.390**
Career Salience (CS)	-.222*	.520**
Readiness (CR)	-.048	.385**
Inconsistent	-.054	.186*
External Barrier (CE)	-.038	.471**

Table 3 displays the correlations for common constructs from the CDMI and the CDDQ. As can be seen in table 3, the results provided support for the convergent validity of the CDMI. It was expected that since both the CDDQ and CDMI are measures of problems in career decision-making, there would be a strong relationship between three scales from the CDMI namely: Need for Career Information (CN), Readiness (CR) Inconsistent Information (CI), with three scales from the CDDQ namely: Lack of Readiness (R), Lack of Information (L), and Inconsistent Information from the CDDQ. Indeed, most of the CDMI scales revealed statistically significant positive correlations with the CDDQ, with the exception of the Decidedness (r=-.033) and the Comfort (r=-.069) scales. The Readiness (r=.703), Need for Career Information (r= .565), and the Inconsistent Information (r=.400) scales tied for the highest correlation with the CDDQ as was expected.

Table 3. Correlations between Scales from the CDMI and the CDDQ main scale

CDDQ Scales / CDMI Scales	Lack of Readiness	Inconsistent Information	Lack of Information
Decidedness	-.033	-.069	-.128
Comfort	-.121	.005	.043
Career Choice Anxiety	.130	.223	.272
Need for Career	.030	.360	.565**
Career Salience	.444*	.029	.016
Readiness	.703**	.251	.498**
Inconsistent Information	.091	.400*	.394*
External Barrier	.270	.275	.467**

4.2.5. Study 5:

The purpose of this study was to examine the test-retest reliability of the CDMI. A total of 50 students (16 males and 34 females) from the 10th, 11th, and 12th grade participated in the study, aged 14-16 years old, with an average age of 15.28, S.D =.53. Students were asked to complete the final draft of the CDMI a second time 6 weeks after the initial response.

4.2.5.1. Results and Discussion

The overall Alpha for the CDMI is equal to .943, which can be considered 'excellent'. Subscale test-retest reliability estimates for the CDMI sub-scales were as follows: Decidedness .80, Comfort .77, Career Choice Anxiety .78, External Barrier .75, Need for Career Information .86, Readiness .79, Career Salience .81, and Inconsistent Information .81. These results represent a moderate level of reliability.

5. GENERAL DISCUSSION

The present series of studies, which involved a total of 1880 students at different schools and grade levels, was successful in developing a reliable and valid measure of adolescent career decision-making constructs. The CDMI Total demonstrated high reliability (α = .94) compared with other instruments with similar intent. For example, the Career Decision Scale (CDS) consistently showed internal consistency in the .80s and test-retest coefficients from .82 to .90 for the Indecision Scale (Osipow, Carney, Winer, Yanico, & Koschier, 1976). Career Decision making Difficulties Questionnaire (CDDQ) received an alpha coefficient of .94 for the total test and a range of .63 to .95 for the three sub-scales (Gati, krausz, & Osipow, 1996). Moreover, the Career Decision Profile (CDP) consistently showed internal consistency in the .70s, ranging from .66 to .80 for the six sub-scales (Jones, 1989). The internal consistency reliability ranged from .65 to .81 for the eight CDMI sub-scales. Scales with reliabilities ranging from .65 to .73 are in need of further development. The results of the exploratory factor analysis and confirmatory factor analysis confirmed the eight-factor structure of the CDMI. The findings of study 4 provide evidence for the convergent validity of the CDMI through its significant positive correlation with the Career Decision Scale (CDS: Osipow, Carney, Winer, Yanico, & Koschier, 1976) beside The Career Decision Difficulties Questionnaire (CDDQ; Gati, krausz, & Osipow, 1996).

In conclusion, the series of five studies provides multiple forms of evidence for the psychometric integrity of the Career Decision Making Indicator (CDMI), a measure of the career decision-making constructs designed specifically for adolescents. The findings imply that CDMI is ready to be used by career counselor in helping school students to identify their career decision difficulties and provide them with necessary interventions. Future studies on the CDMI can extend its validation as well as inform adolescent theory and research.

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